

In the Claims

1. (Currently Amended) A method for anisotropically etching a feature in a substrate comprising the steps of:

subjecting the substrate to an alternating cyclical process within a plasma chamber, said alternating cyclical process having an etching step and a deposition step;

introducing into said plasma chamber a first process gas for depositing a film onto the substrate during the deposition step of said alternating cyclical process;

introducing into said plasma chamber a second process gas for etching the substrate during the etching step of said alternating cyclical process;

regulating pressure of said plasma chamber by setting a throttle valve at a predetermined position set point for a ~~predetermined~~ period of time about 0.05 to 0.5 seconds during at least one step of said alternating cyclical process;

igniting a plasma for a recipe period of time for the deposition step of said alternating cyclical process and the etching step of said alternating cyclical process;

enabling a closed loop pressure control algorithm after said predetermined period of time expires; and

controlling pressure at a recipe specified pressure set point in said plasma chamber through a closed loop pressure control for a period that lasts the remaining time of the step.

2. (Original) The method of claim 1 wherein the predetermined position set point is set to a throttle valve position of a preceding like step of said alternating cyclical process.

3. (Original) The method of claim 1 wherein the predetermined position set point is derived from a throttle valve position of a preceding like step of said alternating cyclical process.

4. (Original) The method of claim 3 wherein the predetermined position set point is derived from an average throttle valve position of a plurality of preceding like steps of said alternating cyclical process.

5. (Original) The method of claim 3 wherein the predetermined position set point is derived from prior calibration experiments.

6. (Original) The method of claim 3 wherein the predetermined position set point is adjusted by an offset from said throttle valve position of said preceding like step of said alternating cyclical process.

7. (Original) The method of claim 6 wherein the offset is about 0.5 to 2 change in position from said throttle valve position of said preceding like step of said alternating cyclical process.

8. (Original) The method of claim 1 wherein the predetermined position set point changes using a predefined function for the duration of said predetermined period of time.

9. (Original) The method of claim 1 wherein the predetermined position set point is modified based on pressure performance of a preceding like step of said alternating cyclical process.

10. (Currently Amended) ~~The method of claim 9 wherein the~~ A method for anisotropically etching a feature in a substrate comprising the steps of:

subjecting the substrate to an alternating cyclical process within a plasma chamber, said alternating cyclical process having an etching step and a deposition step;

introducing into said plasma chamber a first process gas for depositing a film onto the substrate during the deposition step of said alternating cyclical process;

introducing into said plasma chamber a second process gas for etching the substrate during the etching step of said alternating cyclical process;

regulating pressure of said plasma chamber by setting a throttle valve at a predetermined position set point for a predetermined period of time during at least one step of said alternating cyclical process, said predetermined position set point is modified based on pressure performance of a preceding like step of said alternating cyclical process, said modification to the predetermined position set point is based on minimizing time to reach said recipe specified pressure set point;

igniting a plasma for a recipe period of time for the deposition step of said alternating cyclical process and the etching step of said alternating cyclical process;

enabling a closed loop pressure control algorithm after said predetermined period of time expires; and

controlling pressure at a recipe specified pressure set point in said plasma chamber through a closed loop pressure control for a period that lasts the remaining time of the step.

11. (Currently Amended) ~~The method of claim 9 wherein the~~ A method for anisotropically etching a feature in a substrate comprising the steps of:

subjecting the substrate to an alternating cyclical process within a plasma chamber, said alternating cyclical process having an etching step and a deposition step;

introducing into said plasma chamber a first process gas for depositing a film onto the substrate during the deposition step of said alternating cyclical process;

introducing into said plasma chamber a second process gas for etching the substrate during the etching step of said alternating cyclical process;

regulating pressure of said plasma chamber by setting a throttle valve at a predetermined position set point for a predetermined period of time during at least one step of said alternating cyclical process, said predetermined position set point is modified based on pressure performance of a preceding like step of said alternating cyclical process, said modification to the predetermined position set point is based on minimizing deviation from said recipe specified pressure set point;

igniting a plasma for a recipe period of time for the deposition step of said alternating cyclical process and the etching step of said alternating cyclical process;

enabling a closed loop pressure control algorithm after said predetermined period of time expires; and

controlling pressure at a recipe specified pressure set point in said plasma chamber through a closed loop pressure control for a period that lasts the remaining time of the step.

12. (Currently Amended) ~~The method of claim 1 wherein~~ A method for anisotropically etching a feature in a substrate comprising the steps of:

subjecting the substrate to an alternating cyclical process within a plasma chamber, said alternating cyclical process having an etching step and a deposition step;

introducing into said plasma chamber a first process gas for depositing a film onto the substrate during the deposition step of said alternating cyclical process;

introducing into said plasma chamber a second process gas for etching the substrate during the etching step of said alternating cyclical process;

regulating pressure of said plasma chamber by setting a throttle valve at a predetermined position set point for a predetermined period of time during at least one step of said alternating cyclical process, said predetermined period of time is modified based on pressure performance of a preceding like step of said alternating cyclical process;

igniting a plasma for a recipe period of time for the deposition step of said alternating cyclical process and the etching step of said alternating cyclical process;

enabling a closed loop pressure control algorithm after said predetermined period of time expires; and

controlling pressure at a recipe specified pressure set point in said plasma chamber through a closed loop pressure control for a period that lasts the remaining time of the step.

13. (Original) The method of claim 12 wherein the modification to the predetermined period of time is based on minimizing time to reach said recipe specified pressure set point.

14. (Original) The method of claim 12 wherein the modification to the predetermined period of time is based on minimizing deviation from said recipe specified pressure set point.

15. (Canceled) The method of claim 1 wherein said predetermined period of time is about 0.05 to 0.5 seconds long.

16. (Original) The method of claim 1 wherein said first process gas is octofluorocyclobutane.

17. (Original) The method of claim 1 wherein said second process gas is sulfur hexafluoride.

18. (Currently Amended) A method of pressure control in a time division multiplex process comprising the steps of:

regulating a process pressure in a vacuum chamber in at least one step of the time division multiplex process by setting a throttle valve at a predetermined position set point for a ~~predetermined~~ period of ~~time~~ about 0.05 to 0.5 seconds;

introducing into said vacuum chamber at least one process gas;

enabling a closed loop pressure control algorithm after said predetermined period of time expires; and

controlling pressure at a recipe specified pressure set point through a closed loop pressure control for a period that lasts the remaining time of said step of the time division multiplex process.

19. (Original) The method of claim 18 wherein the predetermined position set point is set to a throttle valve position of a preceding like step of said time division multiplex process.

20. (Original) The method of claim 18 wherein the predetermined position set point is derived from a throttle valve position of a preceding like step of said time division multiplex process.

21. (Original) The method of claim 20 wherein the predetermined position set point is derived from an average throttle valve position of a plurality of preceding like steps of said time division multiplex process.

22. (Original) The method of claim 20 wherein the predetermined position set point is derived from prior calibration experiments.

23. (Original) The method of claim 20 wherein the predetermined position set point is adjusted by an offset from said throttle valve position of said preceding like step of the time division multiplex process.

24. (Original) The method of claim 23 wherein the offset is about 0.5 to 2 change in position from said throttle valve position of said preceding like step of the time division multiplex process.

25. (Original) The method of claim 18 wherein the predetermined position set point changes using a predefined function for the duration of said predetermined period of time.

26. (Original) The method of claim 18 wherein the predetermined position set point is modified based on pressure performance of a preceding like step of the time division multiplex process.

27. (Currently Amended) ~~The method of claim 26 wherein the~~ A method of pressure control in a time division multiplex process comprising the steps of:

regulating a process pressure in a vacuum chamber in at least one step of the time division multiplex process by setting a throttle valve at a predetermined position set point for a predetermined period of time, said predetermined position set point is modified based on pressure performance of a preceding like step of the time division multiplex process, said modification to the predetermined position set point is based on minimizing time to reach said recipe specified pressure set point;

introducing into said vacuum chamber at least one process gas;

enabling a closed loop pressure control algorithm after said predetermined period of time expires; and

controlling pressure at a recipe specified pressure set point through a closed loop pressure control for a period that lasts the remaining time of said step of the time division multiplex process.

28. (Currently Amended) ~~The method of claim 26 wherein the~~ A method of pressure control in a time division multiplex process comprising the steps of:

regulating a process pressure in a vacuum chamber in at least one step of the time division multiplex process by setting a throttle valve at a predetermined position set point for a predetermined period of time, said predetermined position set point is modified based on pressure performance of a preceding like step of the time division multiplex

process, said modification to the predetermined position set point is based on minimizing deviation from said recipe specified pressure set point;

introducing into said vacuum chamber at least one process gas;

enabling a closed loop pressure control algorithm after said predetermined period of time expires; and

controlling pressure at a recipe specified pressure set point through a closed loop pressure control for a period that lasts the remaining time of said step of the time division multiplex process.

29. (Currently Amended) ~~The method of claim 18 wherein~~ A method of pressure control in a time division multiplex process comprising the steps of:

regulating a process pressure in a vacuum chamber in at least one step of the time division multiplex process by setting a throttle valve at a predetermined position set point for a predetermined period of time, said predetermined period of time is modified based on pressure performance of a preceding like step of the time division multiplex process;

introducing into said vacuum chamber at least one process gas;

enabling a closed loop pressure control algorithm after said predetermined period of time expires; and

controlling pressure at a recipe specified pressure set point through a closed loop pressure control for a period that lasts the remaining time of said step of the time division multiplex process.

30. (Original) The method of claim 29 wherein the modification to the predetermined period of time is based on minimizing time to reach said recipe specified pressure set point.

31. (Original) The method of claim 29 wherein the modification to the predetermined period of time is based on minimizing deviation from said recipe specified pressure set point.

32. (Canceled) The method of claim 18 wherein said predetermined period of time is about 0.05 to 0.5 seconds long.

33. (Currently Amended) A method for controlling pressure in a vacuum chamber, the method comprising the steps of:

regulating a process pressure in the vacuum chamber by setting a throttle valve at a predetermined position set point for a ~~predetermined~~ period of time 0.05 to 0.5 seconds;

introducing into said vacuum chamber a gas;

enabling a closed loop pressure control algorithm after said predetermined period of time expires; and

controlling pressure at a recipe specified pressure set point in said vacuum chamber through a closed loop pressure control.